

**BRIEF REPORT**

# Physical Activity Patterns in People With Inflammatory Arthritis Indicate They Have not Received Recommendation-Based Guidance From Health Care Providers

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**Objective.** Objectives of this study were to describe exercise patterns among patients with inflammatory arthritis (IA) in four recommended domains (Aerobic, Resistance, Flexibility, Balance), identify exercise barriers and facilitators, and explore patients' perceptions of interactions with rheumatology providers about exercise.

**Methods.** Patients with IA at a single academic medical center were invited to complete a survey about exercise. Patients were recruited for a paper-based survey prior to appointments or a web-based study through the electronic health record if they had been seen in the practice within the past year. Respondents reporting minimum aerobic exercise plus at least one other domain were categorized as "Active," and the remaining as "Inactive." Survey responses were compared between groups.

**Results.** Of 1113 invited, 108 completed the survey. Among these, 60 (56%) reported aerobic exercise, 44 (41%) flexibility, 42 (39%) resistance, and 18 (17%) balance. Forty-three (40%) were categorized as active, 65 (60%) inactive. The active group had lower body mass index, lower reported disease activity, and fewer comorbidities. Active patients reported more self-efficacy, prioritized exercise, improved energy, exercising for weight control, and exercise before arthritis diagnosis (all  $P < .05$ ). The inactive group cited finances, pain, fatigue, and potentially worsening arthritis as barriers (all  $P < .05$ ). Most understood the benefits of exercise. Few perceived that exercise recommendations were addressed by their providers.

**Conclusion.** Approximately half of patients reported regular aerobic exercise; fewer regularly engaged in other types of physical activity. Patients do not perceive they have received exercise guidance from providers, which suggests an opportunity for more prescriptive exercise discussions.

**INTRODUCTION**

Exercise has been shown to be safe and beneficial for people with inflammatory arthritis (IA). Research demonstrates that physical activity (PA) improves disease activity scores, quality of life, sleep, fatigue, pain and stiffness, inflammatory markers, strength, and aerobic exercise capacity (1–4). Therefore, clinical management guidelines for IA advise exercise (5,6). The Centers for Disease Control (CDC) and American Medical Association (AMA)

offer guidance on appropriate levels of exercise by age and the presence of chronic conditions (7,8), but these are not specifically tailored to arthritis. The European League Against Rheumatism (EULAR) Recommendations for Physical Activity in People with Inflammatory Arthritis and Osteoarthritis provide the first evidence-based guidelines about the "type and dosage" of exercise that should be encouraged for patients with arthritis (9). They support the American College of Sports Medicine-American Heart Association (ACSM-AHA) Recommendations as appropriate for

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### SIGNIFICANCE & INNOVATIONS

- Fewer than 20% of people with inflammatory arthritis (IA) report regular engagement in each of the four recommended categories of exercise (aerobic, resistance, flexibility, and balance).
- Previously identified barriers (fatigue, financial constraints, arthritis-related pain, and the belief that exercise may worsen arthritis) and facilitators (confidence in the ability to exercise, improved energy levels associated with exercise, considering exercise a priority, and weight control) are important factors that influence exercise habits in people with IA.
- Patients perceive low engagement from their health care providers on the topic of exercise despite new guidelines intended to guide discussions between providers and patients about forming exercise habits.
- People with IA do not identify physician guidance as a factor that significantly influences their physical activity patterns.

arthritis. Although these offer similar guidance with respect to aerobic and resistance exercise as the CDC and AMA, the EULAR recommendations emphasize the importance of regular participation in four total exercise domains (aerobic, resistance, flexibility, and balance) for those with arthritis. In addition, the EULAR provides recommendations for the “promotion and delivery” of PA, meant to aid health care providers in guiding arthritis patients to form exercise habits.

Although prior studies have quantified levels of PA engagement and identified factors that influence exercise habits in IA populations, none have done these in the context of the four exercise domains (10–12). The purpose of the current study was to investigate levels of engagement in these four domains and to determine the factors that influence patients’ exercise habits. In particular, we aimed to determine whether health care provider guidance was a significant influence for those who participated in more of the recommended exercise domains.

### PATIENTS AND METHODS

**Patients.** Patients 18 to 70 years of age with a diagnosis of rheumatoid arthritis, psoriatic arthritis, spondyloarthritis, or “other” IA who had been seen within the last year at the University of Pennsylvania rheumatology practice were recruited in person or via electronic messaging through the electronic health record (EHR) system to take an 81-question survey about PA and exercise. Those who consented in the office completed a paper copy before their office visit, and those who consented via the electronic record completed the survey online. Patients who received an electronic survey were identified using ICD10 codes and had

a prior visit. Patients with comorbidities that limited their aerobic exercise ability (congestive heart failure, lung disease requiring supplemental oxygen, or currently undergoing treatment for a malignancy) were not invited to participate.

**Survey instrument.** The investigators developed the survey to assess levels of participation in each of the four exercise domains with the understanding that few patients with IA were likely to achieve the recommended levels of exercise in each domain. We considered that arthritis-related factors (pain, range of motion limitations, etc) may hinder patients’ physical capabilities to achieve the recommended levels of exercise. We also anticipated that even those who were physically capable may have altered perceptions of their ability to engage in exercise because of their arthritis. Therefore, the following thresholds for minimal activity in each category were used to facilitate an understanding of which patients in our cohort were performing some level of activity in each category as follows: Aerobic (20 minutes of moderate to vigorous activity on at least 3 days/week), Strength (any time dedicated to strengthening major muscle groups on at least 2 days/week), Flexibility (any time dedicated to range of motion exercises on at least 2 days/week) and Balance (20-30 minutes dedicated to neuromotor and coordination skills on at least two days/week). These modifications were made with reference to the recommendations, which state lower levels may be beneficial for those who are not physically well-conditioned. With respect to aerobic exercise, for example, guidelines state that “≥3 days/week of vigorous exercise” may be sufficient frequency, that “≥20 minutes/day can be beneficial,” and that “light to moderate intensity exercise may be beneficial.” The first portion of the survey asked the patient to answer “yes” or “no” as to whether they participated in these amounts of activity in each domain. Definitions and examples for each domain were provided to help patients answer accurately. A copy of the survey is available in supplementary material online for reference.

The next portion provided statements about facilitators and barriers to exercise engagement and about beliefs regarding how exercise impacts health. Respondents could choose to agree or disagree with these statements. Statements were selected from the Adult Physical Activity Questions on the National Health Interview Survey and adapted from previous studies about PA in populations with chronic conditions (13,14).

The final portion consisted of questions formulated by the authors meant to assess whether patients perceived that their providers had utilized the EULAR recommendations for PA promotion and delivery to provide them with guidance about exercise. Patients could select yes or no answers to these questions.

The survey also ascertained background demographic information including gender, race, education level, and current employment status. It included a Rheumatoid Arthritis Patient Index of Disease 3 (RAPID3) assessment and took approximately 15 to 20 minutes to complete.

**Statistical analysis.** Descriptive statistics were used to characterize the study population. To assess the factors influencing exercise engagement, respondents were placed into an “Active” or an “Inactive” group based on their reported exercise levels. Those who reported our threshold for minimum aerobic exercise engagement (20 minutes on three separate days during the week) plus regular participation in at least one other exercise domain were categorized into the “Active” group. Characteristics and survey responses were compared between these groups using *t* test for continuous and  $\chi^2$  or Fisher exact test for categorical variables.

**Ethics approval.** This study was considered exempt by the University of Pennsylvania Institutional Review Board.

## RESULTS

Of the 1113 total patients who were invited to complete the survey, approximately 1050 were invited through the EHR. Of those that responded to the EHR invitation, 55 participated in the survey and 20 declined. All others (63 patients) were approached in clinic to complete a paper survey, and 53 chose to participate. In total, 108 completed this survey (9.7% response rate). Fifty-three (49%) completed it after consent in the office and 55 (51%) after EHR invitation.

Sixty respondents (56%) reported participation in regular minimum aerobic exercise, 44 (41%) in flexibility, 42 (39%) in resistance, and 18 (17%) in balance exercises. The largest proportion of these reported walking (65%), followed by use of aerobic equipment such as an elliptical machine (30%), group fitness classes (27%), cycling (23%), running or jogging (12%), and less than 10% reported participation in individual sports, team sports, or swimming. Those who reported resistance exercises reported use of free weights (57%), body weight exercises (42%), resistance bands (40%), or weight machines (38%).

Forty-three (40%) reported regular participation in minimum aerobic exercise plus at least one of the other domains and were considered active for the purposes of this study. Sixty-five (60%) were categorized as inactive. In the active group (N = 43), only 8 (19%) patients reported participation in all four recommended exercise domains of PA, 18 (42%) in aerobic exercise plus two additional domains, and 17 (37%) in aerobic exercise plus one additional domain.

There were no significant differences between active and inactive patients with respect to demographics such as gender, race, education level, or current employment status. Comparison of active and inactive groups showed that the active group had lower body mass index and lower RAPID3 Scores (Table 1). The active group also had lower prevalence of diabetes, sleep apnea, and tobacco use.

A larger proportion of the active group agreed with statements about confidence in the ability to exercise (active 91% vs inactive 60%) and considering exercise a priority (93% vs

**Table 1.** Baseline patient characteristics and comorbidities

	Active (N = 43)	Inactive (N = 65)	<i>P</i>
Age (SD), y	51 (14)	50 (12)	.71
BMI, kg/m <sup>2</sup>	27	31	.002
ESR, mm/s	23	20	.72
CRP, mg/dL	8.4	5.9	.73
RAPID3	6.6	9.5	.02
Diagnosis, N (%)			.45
Rheumatoid	26 (60%)	35 (54%)	
Psoriatic	3 (7%)	10 (15%)	
Ankylosing spondylitis	12 (28%)	19 (29%)	
Other	2 (5%)	1 (2%)	
Female, N (%)	27 (63%)	46 (71%)	.60
Osteoarthritis, N (%)	21 (49%)	32 (49%)	.97
Thyroid disease, N (%)	3 (7%)	6 (9%)	.63
Hyperlipidemia, N (%)	16 (37%)	22 (34%)	.72
Hypertension, N (%)	9 (21%)	22 (34%)	.15
Diabetes, N (%)	2 (5%)	13 (20%)	.02
Using tobacco, N (%)	1 (2%)	10 (15%)	.03
Anxiety/depression, N (%)	6 (14%)	18 (28%)	.09
Fibromyalgia, N (%)	2 (5%)	9 (14%)	.12
Arthroplasty, N (%)	4 (9%)	9 (14%)	.48
Sleep apnea, N (%)	1 (2%)	11 (17%)	.02

Abbreviations: BMI, Body Mass Index; CRP, C-Reactive Protein; ESR, Erythrocyte Sedimentation Rate; RAPID3, Rheumatoid Arthritis Patient Index of Disease 3; SD, Standard Deviation.

65%) (Table 2). A larger proportion of the active group identified weight control (81% vs 46%) and improved energy (95% vs 81%) as motivators for their exercise engagement. The active group was more likely to report exercise prior to arthritis diagnosis (86% vs 64%), and significantly more patients in this group also reported that they increased their exercise levels *after* their arthritis diagnosis (19% vs 5%). More patients in the active group agreed they would like their physician to discuss exercise with them more (41% vs 20%).

More patients in the inactive group cited finances (inactive 30% vs active 10%), pain (47% vs 26%), fatigue (52% vs 19%), and concern that exercise may worsen arthritis (17% vs 2%) as exercise barriers. A larger proportion of this group agreed with the statement that their PA levels decreased after their arthritis diagnosis (73% vs 54%).

The vast majority of patients in both groups agreed with statements about the general health and arthritis-specific benefits of exercise (Table 2). The majority in both groups agreed that their rheumatologist had stated the importance of exercise to them. However, only 8 in the active group and 12 in the inactive group (19% of all respondents) reported that any health care provider had ever discussed the four recommended domains of exercise with them. A minority of patients in both groups perceived that any of the EULAR recommendations for promotion and delivery of PA had been utilized by their providers during their clinical care to encourage the formation of exercise habits. For example, only 11 (26%) patients in the active group and 18 (28%) patients in the inactive group reported that a provider had ever spoken to them about exercises that may be contraindicated due to their arthritis

**Table 2.** Factors influencing patient physical activity and exercise habits

Category	Agree/disagree statement	Active N (%)	Inactive N (%)	P
Self-efficacy and self-perception	I am as active or more active than most other people my age.	34 (79)	20 (30)	<.001
	I know I can exercise if I want to do it.	39 (91)	39 (60)	<.001
	I consider exercise a priority.	38 (93)	40 (65)	.001
General motivators and facilitators	Exercise gives me more energy.	40 (95)	52 (81)	.037
	I exercise to control my weight.	35 (81)	29 (46)	<.001
	Exercise helps people to look better.	42 (98)	59 (94)	.34
	People who exercise are healthier in general.	41 (95)	61 (95)	.99
General obstacles and barriers	Financially I cannot afford the kind of exercise I want to do.	4 (10)	19 (30)	.014
	Exercise is a waste of my time.	0 (0)	1 (2)	.41
	I find exercise boring.	9 (21)	22 (34)	.15
	I don't have time to exercise regularly.	10 (24)	24 (37)	.16
Health-related motivators	I know I will be healthier if I exercise.	41 (95)	61 (95)	.99
	I know my arthritis will be less painful if my weight is healthy.	38 (93)	56 (90)	.68
	People with arthritis who exercise are healthier than people with arthritis who do not exercise.	39 (90)	52 (83)	.24
	Exercise is as important as taking medication for my arthritis.	38 (91)	50 (79)	.13
	I have a person/partner who supports me to stay active	30 (71)	33 (56)	.11
Health-related barriers	Exercise is dangerous for someone with my type of arthritis.	2 (5)	9 (14)	.12
	My arthritis is too painful for me to exercise.	11 (26)	30 (47)	.026
	Fatigue prevents me from exercising.	8 (19)	34 (52)	<.001
	Exercise will make my arthritis worse in the future.	1 (2)	11 (17)	<.001
Health-related perceptions and behaviors	I wish my doctor would talk to me more about exercise.	17 (41)	13 (20)	.031
	I was physically active before my diagnosis.	37 (86)	40 (64)	.011
	I have become less physically active after my diagnosis.	22 (54)	46 (73)	.043
	I have become more physically active after my diagnosis.	8 (19)	3 (5)	.019

(Recommendation 5, Table 3). Only 7 (17%) in the active group and 14 (22%) in the inactive group said health care providers had helped them identify barriers to their exercise engagement (Recommendation 7, Table 3). There were no differences between the groups in the responses for any of the questions related to these 10 recommendations.

## DISCUSSION

The 2018 EULAR recommendations for PA in people with IA and osteoarthritis have provided the first set of guidelines to detail the quality and quantity of PA that should be encouraged for people with these conditions. In this study, we explored the current PA of patients with IA using the specified subtypes of activity in the recommendations. The results demonstrate an opportunity for much improvement in PA in patients with IA and in rheumatologist “prescribing” of exercise.

Previous studies have determined similar PA patterns and have identified many of the same barriers and facilitators to exercise. Prior research has also demonstrated that roughly 40% of people with IA participate regularly in PA (15). Niederman et al

and Gecht et al found individual motivation and belief in one's ability to exercise to be important facilitators (14,16). Like these studies, we found that positive physical effects (weight control and improved energy) were motivators for exercise. Unlike previous studies, our results did not indicate a difference between active and inactive groups with respect to access to social support (17,18). Arthritis-related pain, fatigue, and fear of causing harm to joints were significant impediments to exercise. The consistency of these results with prior findings indicates that there remains a large proportion of patients with IA who are inactive because of persistent barriers that we have yet to successfully address.

Our results demonstrate there is a lack of recommendation-based guidance about exercise from health care providers to patients with IA. Few patients perceived provider utilization of the EULAR recommendations during their clinical care, and active patients did not appear to receive more counseling. However, our results also suggest that a general understanding of exercise benefits (the majority in both groups agreed with statements about the positive effects of exercise) is not enough to motivate regular PA in this population (overall participation in

**Table 3.** Utilization of EULAR PA promotion/delivery recommendations by providers

EULAR PA Promotion/Delivery Recommendation <sup>a</sup>	Pertinent Survey Question(s)	Active N (%)	Inactive N (%)	P
1: Promoting PA should be an integral part of standard care.	Has your rheumatologist emphasized the importance of PA?	32 (76)	53 (84)	.31
2: All HCPs should take responsibility for and cooperate to promote PA, including making necessary referrals, to ensure that people receive appropriate PA interventions.	Has another physician emphasized the importance of PA?	33 (79)	49 (78)	.92
3: Competent providers should deliver PA interventions.	Have you received a referral for help with PA?	17 (43)	28 (44)	.90
4: HCPs should evaluate PA to identify which of the four domains of exercise can be targeted for improvement.	Has an HCP explained the four recommended domains of PA to you?	8 (19)	12 (19)	1.0
5: General and disease-specific contraindications should be identified and taken into account.	Has an HCP /specialist <sup>b</sup> discussed types of PA you should not do because of arthritis?	11 (26)	18 (28)	.83
6: PA interventions should have clear, personalized aims.	Has an HCP/specialist worked with you to develop aims/goals for PA?	14 (33)	23 (37)	.74
7: General and disease-specific barriers and facilitators related to performing PA should be identified and addressed.	Has an HCP/specialist helped you to identify barriers to PA related to your general life?	7 (17)	14 (22)	.51
	Has an HCP/specialist helped you to identify barriers to PA related to your arthritis?	17 (41)	20 (31)	.33
8: Necessary adaptations to general PA should be based on a comprehensive assessment of patient factors.	Has an HCP/specialist helped you create an exercise program tailored to your health-related and personal needs?	17 (40)	20 (31)	.33
9: HCPs should plan and deliver interventions that include behavioral change techniques, self-monitoring, goal setting, action planning, feedback and problem solving.	Has an HCP/specialist helped you to monitor or self-monitor your PA?	12 (29)	16 (25)	.68
	Has an HCP/specialist discussed with you techniques to overcome barriers to PA?	11 (26)	18 (28)	.33
10: HCPs should consider different modes of delivery of PA in line with people's preferences.	Has an HCP/specialist discussed with you different PA options based on your preferences/needs?	14 (33)	18 (28)	.57

Abbreviations: HCP = Health care provider; PA = physical activity.

<sup>a</sup> See Rausch Osthoff et al (9). Adapted from Rausch Osthoff et al with permission.

<sup>b</sup> HCP/specialist was used for the purpose of table formatting; patients were given the listing "physician, physical therapist, exercise trainer, or another specialist" as examples on the survey, which is available in the supplementary material.

the four exercise domains was low). Although improved exercise counseling is important, the formation of healthy exercise habits for people with IA will require interventions and resources beyond the clinic setting.

As with all survey-based studies, the results of this study have limitations. Although all eligible patients in our large university practice received an invitation to complete our survey during the recruitment phase, our response rate was low, creating the opportunity for selection bias to impact our results. Lack of incentive offered for participation may have been one reason for low response rate. Had incentive been offered, patients with less available free time may have chosen to participate. Our results may unfairly reflect the responses of those who have more free time and, for that reason, exercise more regularly. Furthermore, those who chose to participate may reflect a segment of our patient population who are more adept at logging into their EHR. It is fair to question whether those who have made effort to utilize their EHR place a higher value on their health and are, therefore, more likely to exercise. These people may also be more likely to engage with their providers in

conversations about exercise, which may also explain why a rather large proportion reported having received exercise guidance from a physician in comparison to previous studies. Although overall response rate was low, the large majority of nonresponses were in the electronically invited group. It was not possible to separately analyze responses from electronic versus paper respondents because of the methods used to collect and store the data. Differences in selection of respondents by use of two methods of data collection may have influenced the results, although the direction of any resultant bias is difficult to predict. Finally, the reader should be reminded that our definitions for regular participation in each of the four exercise domains was *less than the recommended levels* for reasons explained earlier. Although we believe our results discern those who participate in substantial amounts of regular exercise and serve as a strong baseline description of PA patterns in an IA population, they do not indicate the number of people with IA who attain the recommended levels of exercise.

In conclusion, this study is meant to provide an initial description of exercise patterns in people with IA in the context of the new

EULAR recommendations and to identify the factors that influence these patterns. The results importantly emphasize a persistent lack of health care provider guidance for people with IA on the topic of exercise. Prior research has identified low physician knowledge (from both the perspective of the patient and the physician) about exercise as a reason for this lack of guidance (14,16). Although the majority of rheumatologists have not been trained to counsel patients about PA (19), the EULAR recommendations in the form of the Promotion and Delivery of Physical Activity in Adults with Inflammatory Arthritis and Osteoarthritis have bestowed all health care providers with a resource to become more educated about exercise. It is the responsibility of the health care providers who care for patients with IA to become acquainted with these recommendations. In addition to facilitating more purposeful conversations with patients about exercise, knowledge of these guidelines will empower providers to recognize existing exercise programs that will be beneficial for patients with IA and to refer them to appropriate exercise interventions to influence the formation of healthy exercise habits.

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## AUTHOR CONTRIBUTIONS

All authors drafted the article or revised it critically for important intellectual content, and all authors gave final approval of the version of the article to be published.

**Study conception and design.** Freid, Ogdie, Baker.

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